

ITS Field Operational Test Summary

Irvine Integrated Ramp Meter/Adaptive Signal Control

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Introduction

The Irvine Integrated Ramp Meter/Adaptive Signal Control (IRM/ASC) ITS Field Operational Test demonstrated an integrated system to adjust traffic on freeway entrance ramps based on existing traffic volumes and speeds in the total highway network (freeway and adjacent arterial highways and streets). The test has three major foci: a systemwide adaptive ramp meter system (SWARMS), an adaptive traffic signal control system, known as Optimal Policies for Arterial Control (OPAC), and integrated corridor control using the above freeway and arterial components.

The test has three purposes:

- Evaluate the performance of adaptive ramp metering
- Assess the technical and performance issues of using OPAC on an arterial
- Assess the use of SWARMS and OPAC for corridor management.

The test is located in the City of Irvine, in Orange County, CA. Data collection will occur in September 1998. A final report is expected in March 1999.

Project Description

Existing signal control systems, in general, adjust signal timing according to the conditions at a single intersection or freeway entrance ramp. In some cases, the signal timing may be coordinated among a series of intersections. The Irvine Field Operational Test is an attempt to control signals by taking account of the “big picture” of traffic conditions over a significant section of the freeway and arterial street network. The SWARMS and OPAC tools will facilitate the coordination of signal timing and policies along a transportation corridor spanning several transportation agencies. Figure 1 presents a diagram of the Irvine IRM/ASC project.

The SWARMS component of the test is designed to provide a system-wide approach to freeway management. SWARMS will be installed on all freeways in CalTrans District 12 (Orange County). Freeways will be divided into sections, with each section reflecting similar traffic congestion characteristics. Ramp meter rates will be set using algorithms that take account of local traffic conditions, and conditions on other freeway sections. The intent is to improve overall network efficiency.

The OPAC component of the test consists of a deployment of OPAC at approximately 30 existing signal controlled intersections. The intersections to be included are on Alton Parkway, located between and generally parallel to I-5 and I-405. Adaptive traffic control offers the potential for reduced traffic congestion and smoother traffic flow, by predicting when ‘platoons’ of traffic from one intersection will arrive at the next intersection downstream. During the intervening period, the control system can give priority to traffic on cross streets. As part of the OPAC deployment,

2070 controllers will be installed at OPAC intersections, and loop detectors will be installed 600 to 800 feet upstream (compared to existing detectors at 200 to 300 feet).

The integrated corridor management component of the test will assess the combined use of SWARMS and OPAC for a multi-agency approach to freeway and arterial management. Test personnel will develop an arterial response plan (ARP) to support CalTrans District 12 and the City of Irvine as they manage freeway incidents. The ARP will facilitate selection of appropriate traffic management plans to divert freeway traffic to Alton Parkway and then back to the freeway. Traffic management tools for this effort include signal timing plans and changeable message signs on the freeway and arterials.

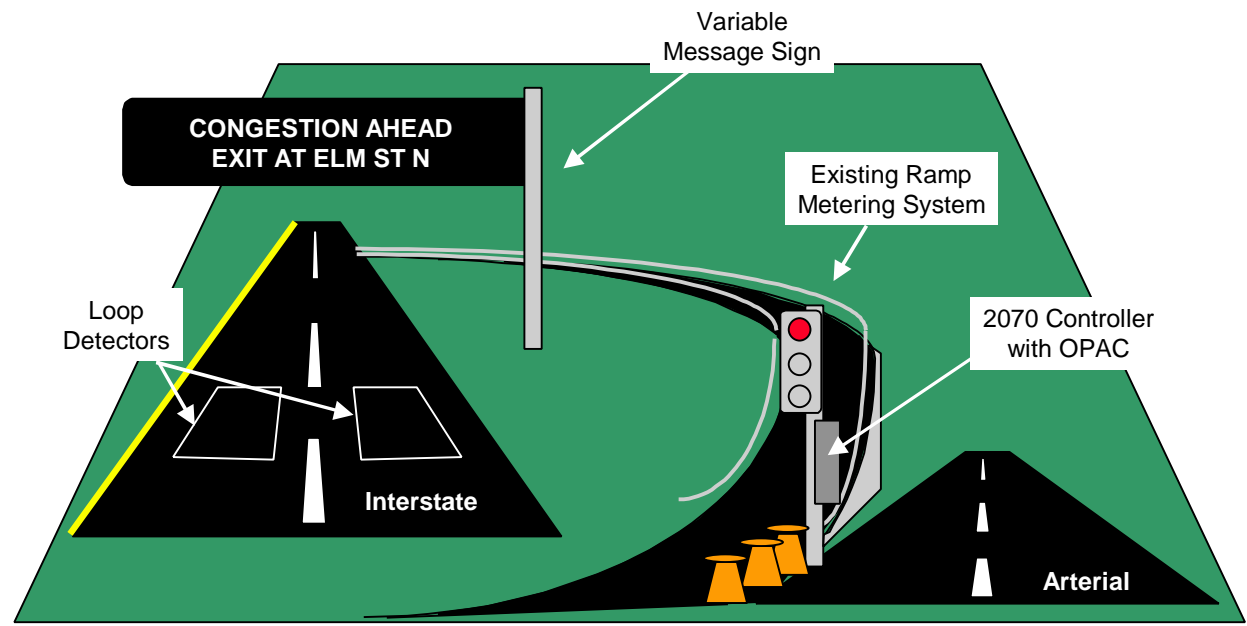


Figure 1: Irvine IRM/ASC Diagram

Test Status

Data collection will commence in September 1998. The final report is due in March 1999. No results are currently available.

Test Partners

California Department of Transportation

City of Irvine

Federal Highway Administration

P.B. Farradyne (OPAC)

References

None published.